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Digital Rights Management potentials and knowledge sharing in higher education

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Abstract
The failure of traditional DRM systems to answer the demands for an effective, user-friendly copyright management, combined with their lack of required computerised support and flexibility to scale to Internet-wide copyright management, led to the emergence of alternative licensing systems commonly used in higher education institutions. Interoperability being the key issue for DRM systems, the directions proposed are not excluding alternative licensing systems like Creative Commons for existing digital content but rather acceptance of latest achievments in forms of Open Digital Rights Language for learning objects in e-learning environment and Semantic Copyright Management for Web 2.0 knowledge sharing in higher education institutions.

Keywords: Digital Rights Management, Copyright law, knowledge sharing, higher education

1. Introduction: from individual to global knowledge

One of the latest changes of Internet, the so-called Web 2.0, has basically erased the boundaries between creators and consumers of digital content. Digital content by nature is very vulnerable to unauthorized distribution and use. The term digital content (or digital work or digital resource) refers to the target of protection of usage rights of participants in a content distribution channel. New services such as social networking sites, blogs, wikis, and virtual

communities have allowed people with common interests to share knowledge and collaborate in innovative ways thus making Web 2.0 ideal for supporting knowledge sharing in higher education institutions.

We witness the ability to create content in many forms, adapted to circulate through vast set of media, enhanced by the development and widespread use of new technologies.

The accessibility of digital content in higher education and other science institutions imply problems such as the rights of creators for an appropriate reward for their efforts and the rights of consumers to free and open access to knowledge, books, learning objects and materials and other educational content. After digital content is downloaded, no further protection is provided on that content.

Digital Rights Management technologies were developed to prevent purchasers from unauthorized copying of digital content, to control the use of digital content, and to enable the development of digital distribution platforms on which innovative business models can be implemented (Hwang, Yoon, Jun, Lee, 2004.)

There are several definitions and of DRM. DRM is the management of the creation, manipulation, distribution, and consumption of digital information (Glew, 2001). DRM can be defined as a set of technologies that collectively support all stages in the life cycle of content (creation, manipulation, distribution, and consumption) by preventing illegal copying while allowing the imposition of fees, processing of payments, and protection of each principal's rights and profits. Principals may include any of the participants involved in the life cycle of content, for example content creators, providers, distributors, users, and rights holders. The goal of DRM technologies is to enable the distribution of digital content in a manner that protects the rights of all parties involved (Hwang, Yoon, Jun, Lee, 2004.)

2. The need for Digital Rights Management in knowledge sharing

In the context of e-Learning, knowledge between teachers and students is often shared via online discussion forums. The sharing of teaching-related knowledge may help teachers solve a variety of problems that they face, and the appropriate use of online knowledge-sharing activities is expected to assist teachers' knowledge sharing (Hou, Sung, Chang, 2009.).

Promoting the exchange and reuse of digital content created in higher education institutions in a Web 2.0 collaborative environment, while respecting and rewarding the intellectual property of the various contributors, are the two key topics to be concered of before e-learning and knowledge sharing can become cost effective and widespread. García and Gil (2008.) define that Copyright management is the key issue for Internet-wide knowledge sharing and reuse because most of the artefacts used for knowledge storage and communication are governed by copyright rules.

Digital Rights Management (DRM) is an emerging solution to the problem of managing intellectual property rights over learning objects in e-learning systems, knowledge sharing within and outside higher education institutions including identifying rights holders, the applicable allowable permissions and tracking usage (Iannella 2002.).

There are several ongoing projects regarding DRM in Europe like:

1. The INDICARE project: an ongoing dialogue on consumer acceptability of DRM solutions in Europe. It is an open and neutral platform for exchange of facts and opinions, mainly based on articles by authors from science and practice
2. The AXMEDIS project: a European Commission Integrated Project of the FP6. The main goal of AXMEDIS is automating the content production, copy protection and distribution, reducing the related costs and supporting DRM.

Hwang, Yoon, Jun and Lee (2004.) explored the issues associated with content distribution and DRM. They designed prototype DRM system that distributes due royalties among participants, enforces content usage rules, and distributes content keys securely in the content distribution channel.

It is obvious thou, that traditional Digital Rights Management (DRM) systems are not very effective in terms interoperability in open environments like the Internet. Also, they are not expressive enough to easily accommodate the licensing schemes required by the new knowledge networks emerging in the digital space (García, Gil, 2008.) DRM focuses on controlling content access, the last step in the copyright value chain, and pays little attention to the previous ones: creation, derivation, recording, communication, etc.

The use of digital rights management has encountered cynicism and criticism from users and owners alike. Content owners are concerned that the encryption remains vulnerable to attack and users complain that digital rights management systems can reduce the ease of use (Craig, Graham 2003).

Cohen (2003.) indicates that DRM technologies may include technologies that can be used to impose direct functionality restrictions on digital content which can generate added transaction costs. Direct functionality restrictions also raise the risk of loss of access to content.

However, there are open licensing initiatives, like Creative Commons, and its programs like Science Commons and ccLearn which show really promising results.

Creative Commons (http://creativecommons.org/), founded in 2001., is a nonprofit corporation dedicated to making it easier for people to share and build upon the work of others, consistent with the rules of copyright providing free licenses and other legal tools to mark creative work with the freedom the creator wants it to carry. Creative Commons licenses are inspired in part by the Free Software Foundation's GNU General Public License (GNU GPL). In the years following the initial release, Creative Commons and its licenses have grown at an exponential rate around the world. The licenses have been further improved, and ported to over 50 international jurisdictions. By the year 2008., it is estimated 140 million Creative Commons licensed works. There are three kinds of permissions (reproduction, distribution and derivative works), one prohibition (commercial use) and four requirements (attribution, notice, share alike and source code). However, this is not flexible and powerful enough to build the kinds of licenses required by Science Commons, as noted in the concept paper for this initiative (Wilbanks, 2006).

Science Commons (http://sciencecommons.org/) has three interlocking initiatives designed to accelerate the research:

1. Making scientific research “re-useful”: help people and organizations open and mark their research and data for reuse
2. Enabling “one-click” access to research materials: help streamline the materials-transfer process so researchers can easily replicate, verify and extend research
3. Integrating fragmented information sources: help researchers find, analyze and use data from disparate sources by marking and integrating the information with a common, computer-readable language

The most important for the subject presented in this paper is ccLearn. Launched in 2007, ccLearn (http://learn.creativecommons.org/) is a division of Creative Commons, dedicated to realizing the full potential of the internet to support open learning and open educational resources. With a mission to minimize legal, technical, and social barriers to sharing and reuse of educational materials, ccLearn is developing brand new tools to integrate Creative Commons into open education.

Brown and Adler (2008.) cite that the most visible impact of the Internet on education to date has been the Open Educational Resources (OER) movement (http://www.oercommons.org), which has provided free access to a wide range of courses and other educational materials to anyone who wants to use them. The movement began in 2001. with MIT’s OpenCourseWare (OCW) initiative (http://ocw.mit.edu/), which today provides open access to undergraduate-and graduate-level materials and modules from more than 1,700 courses covering virtually all of MIT’s curriculum. The OER and OCW base their DRM on Creative Commons licensing system.

However, despite the success of Creative Commons licenses, who estimates more than 140 millions of works licensed under its terms, this initiative is not seen as an alternative to DRM. The main reason is the lack of flexibility of the available licensing terms. There are mainly six different Creative Commons licenses, all of them non-commercial, and just recently a rudimentary protocol has been introduced for extending licenses with custom licensing schemes.

Consequently, although it is possible to provide computer support for simple services like content search, there are not mechanisms for customisation and advanced computerised support that enable an Internetwide copyright-based alternative to DRM systems. And the recent license extension mechanism makes computerised support even harder because custom terms are based on user contributed unstructured text and links (García, Gil 2008.).

3. Guidelines for a sustainable DRM model: harmonization of knowledge sharing in higher education

As Cope and Freeman (2001.) state, Digital Rights Management (DRM) solution to challenges regarding knowledge sharing in higher education institutions and e-learning environment requires development of sophisticated techniques that keep in balance the rights of all creative and commercial participants along the supply chain from the creator to the consumer:

1. granularisation of content
2. automation of content management
3. microtransactions within the e-commerce field

The DRM Watch review on DRM standards (Rosenblatt, 2006) shows that interoperability is a key issue for DRM systems. According to Rosenblatt, interoperability cannot be solved by standards alone nor by technology alone. It will ultimately be up to rights holders to determine what content transfer operations they will allow.

Interoperability and transfer across different platforms will rely on compatible standards being adopted across different media. The success of DRM will therefore depend upon standards being both interoperable for users and protective for the content owners (Craig and Graham 2003).

The Open Digital Rights Language (ODRL) Initiative is an international effort aimed at developing and promoting an open standard for rights expressions. ODRL is intended to provide flexible and interoperable mechanisms to support transparent and innovative use of digital content in publishing, distributing and consuming of digital media across all sectors and communities (http://odrl.net/, 2009.).

The ODRL information model (Iannella 2002.), shown in Figure 1, consists of the following core entities:

1. Learning Objects: uniquely identifiable content at any level of granularity (may include Encryption information for secure asset delivery);
2. Rights: the rights information consisting of:
    a. Permissions: actual usages allowed over the Learning Objects,
    b. Constraints: limits to these Permissions,
    c. Conditions: exceptions to control Permissions, and
    d. Requirements: obligations needed to exercise the Permission;
3. Parties: include end users, roles, and Rights Holders who can assert some form of ownership over the Learning Objects and/or its Permissions;
4. Offers: proposals from Rights Holders for specific Rights over their Learning Objects (usually to end users);
5. Agreements: when Parties enter into contracts with specific Offers.

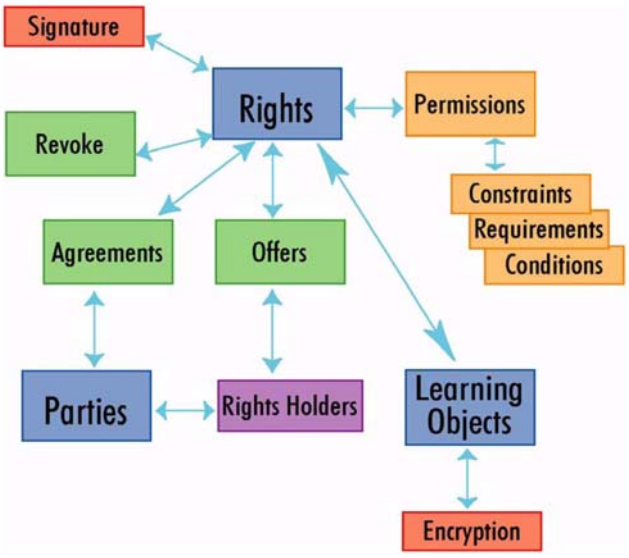

Figure 1.: The ODRL information model (Iannella 2002.).

Other authors propose the Semantic Web approach to DRM (García, Gil, (2008.). It is a new approach that could extract the full potential from the Internet as a knowledge sharing medium. Their concept can be seen as a achievable possibility when we observe the success of the Creative Commons initiative whose objective is to promote knowledge sharing and reuse thorough innovative copyright and licensing schemes.

The semantic web approach to copyright management constitutes an alternative to traditional DRM concepts. It is an expressive conceptual framework, the Copyright Ontology, which provides the building blocks for flexible machineunderstandable licenses. Altogether, it constitutes a tool that helps people state the copyright conditions for the knowledge they share and how it might be reused. A way to build an Internet-wide licensing network adapted to particular needs: commercial or non-commercial, open or closed access, reusable share-alike content, etc.

4. Conclusion

DRM as a critical issue for effective e-learning and knowledge sharing within information communities require flexible and expressive DRM solutions. The failure of traditional DRM systems to answer the demands for an effective, user-friendly copyright management, combined with their lack of required computerised support and flexibility to scale to Internet-wide copyright management, led to the emergence of alternative licensing systems, like Creative Commons.

The directions that should be taken are not excluding traditional DRM solutions nor alternative licensing systems like Creative Commons for existing digital content but rather acceptance of latest achievments in forms of Open Digital Rights Language for learning objects in e-learning environment and Semantic Copyright Management for Web 2.0 knowledge sharing in higher education institutions.

Literature

Bates, A.W., (2000.): Managing technological change: Strategies for College and University Leaders, Jossey-Bass Publishers, San Francisco, USA

Brown J. S., Adler R. P., (2008.): Minds on Fire: Open Education, the Long Tail, and Learning 2.0., EDUCAUSE Review, Volume 43 (no.1), pages 16-32., http://net.educause.edu/ir/library/pdf/ERM0811.pdf

Cohen, J., (2003.): The role of scientific and technical data and information in the public domain: The challenge of DRM technologies, The National Academies Press, Washington DC, USA

Cope, B., Freeman, R., (2001.): Digital Rights Management and Content Development, Common Ground Publishing Pty Ltd, RMIT University, Australia

Craig, C., Graham, R., (2003.): Rights management in the digital world, Computer Law & Security Report, Volume 19, Issue 5, pages 356-362.

García, R., Gil, R., (2008.): Semantic Copyright Management for Internet-wide Knowledge Sharing and Reuse, Emerald Online Information Review, Volume 32, No. 5, pages 585-595.

Glew, N., (2001.): TDB and object encodings. InterTrust Technologies Corp., http://www.intertrust.com

Hou, H.T., Sung, Y.T., Chang, K.E., (2009.): Exploring the behavioral patterns of an online knowledge-sharing discussion activity among teachers with problem-solving strategy, Teaching and Teacher Education, Volume 25, pages 101-108.

Hwang, S.O., Yoon, K.S., Jun, K.P., Lee, K.H., (2004.): Modeling and implementation of digital rights, The Journal of Systems and Software, Volume 73, pages 533-549.

Iannella, R., (2002.): Digital Rights Management (DRM) in Education - The Need for Open Standards, A Position Paper for the IEEE LTSC and CEN/ISSS LTWS Digital Rights Expression Language Study Group Workshop, Kirkland, Washington, USA

Katulić, T., (2006.): Uvod u zaštitu intelektualnog vlasništva u Republici Hrvatskoj, CARNet, Zagreb

Martin, M., Agnew, G., Boyle, J., McNair, J., Page, M., Rhodes, W. (2002.): DRM Requirements for Research and Education, The NSF Middleware Initiative and Digital Rights Management Workshop

Open Digital Rights Language (ODRL) Initiative
http://odrl.net

Rosenblatt, B. (2006), 2005 Year in Review: DRM Standards, DRM Watch, http://www.drmwatch.com/standards/article.php/3574511

Wagner, K.I., (1998.): Intellectual Property: Copyright Implications for Higher Education, The Journal of Academic Librarianship, Volume 24, Number 1, pages 11-19.

Wilbanks, J., Boyle, J., (2006): An Introduction to Science Commons, Science Commons concept paper,
http://sciencecommons.org/wp-content/uploads/ScienceCommons_Concept_Paper.pdf